

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Manabu MIZUSAKI

Serial No. 09/847,370

GROUP 2827

Filed May 3, 2001

Examiner J. Mitchell

ELECTRODE STRUCTURE OF A CARRIER SUBSTRATE OF A SEMICONDUCTOR
DEVICE

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

In compliance with Rules 1.97 and 1.98, and in fulfillment of the duty of disclosure under Rule 1.56, the accompanying documents, copies of which are attached to this statement, are made of record on the enclosed sheet.

A concise explanation of the relevance of these items is that these references were cited by the United Kingdom Patent Office in the corresponding United Kingdom application Serial No. 0110904.0. A copy of the United Kingdom Official Action in which they were cited is attached hereto.

Under the provisions of 37 CFR 1.97(e), the undersigned hereby certifies that each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign Patent Office in a counterpart

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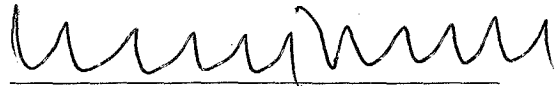
Serial No. 09/847,370

foreign application not more than three months prior to the
filing of this Statement.

Respectfully submitted,

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By



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April 16, 2002



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Your Reference: AJR/43109
Application No: GB 0110904.0

28 February 2002

Dear Sirs

Patents Act 1977:
Combined Search and Examination Report under Sections 17 and 18(3)

Latest date for reply: 28 August 2002

I enclose two copies of my search and examination report and three copies of the citations.

By the above date you should either file amendments to meet the objections in the report or make observations on them. If you do not, the application may be refused.

Publication

I estimate that, provided you have met all formal requirements, preparations for publication of your application will be completed soon after **2 April 2002**. You will then receive a letter informing you of completion and telling you the publication number and date of publication.

Amendment/withdrawal

If you wish to file amended claims for inclusion with the published application, or to withdraw the application to prevent publication, you must do so before the preparations for publication are completed. **No reminder will be issued.** If you write to the Office less than 3 weeks before the above completion date, please mark your letter prominently: **"URGENT - PUBLICATION IMMINENT"**.

[†]Use of E-mail: Please note that e-mail should be used for correspondence only.



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Application No: GB 0110904.0

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28 February 2002

Yours faithfully

Carol Ann McQueen
Examiner

Important information about combined search and examination

I also ask that you take note of the following points. These might have a bearing on the future stages of your application because the examination report has been sent to you before your application has been published.

- (a) You may file voluntary amendments before making a full response to my examination report. We will publish with your application any new or amended claims you file voluntarily or as a full response, provided that they are received before preparations for publication are completed. It would help us when you file amendments before publication if you could **prominently indicate** in a covering letter whether or not the amendments are intended as a full response to the examination report.
- (b) If you file a full response to the examination report before your application is published I will consider it as soon as possible. However, if this would disrupt the publication of your application, I would have to delay taking any action until the application had been published. This delay could be up to 3 months, depending upon when we receive your response.
- (c) There is another situation when there might be a delay between you filing a full response and the Patent Office responding to it. This would arise if you met all my objections but your application had not or had only recently been published. I could not report the outcome of my re-examination until I was satisfied that the search was complete for documents published before the priority date of your invention and that anybody interested in the application has had three months following publication of the application to make observations on the patentability of your invention.
- (d) Provided that the requirements of the Act have been met, I can send your application to grant as early as three months after publication. Before doing so I will bring the original search up to date and raise with you any further objection that might result from this top-up search. However, there is a possibility that at that time I may not have access to all the patent applications published after the priority date of your invention and of possible relevance to your application. If this is the case I would have to complete the search after grant and if necessary raise any new found novelty objection then.



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Application No: GB 0110904.0
Claims searched: All

Examiner: Carol Ann McQueen
Date of search: 27 February 2002

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): H1K (KRG, KRK)

Int Cl (Ed.7): H01L 23/06, 23/482, 23/485, 23/495, 23/66, 29/40, 29/41

Other: ONLINE: EPODOC, WPI, JAPIO, OPTICS

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0631313 A1 (MITSUBISHI)	All
A	JP 110317470 (DENSO CORP)	All
X	US 5962922 (WANG) Abstract, col. 2 lines 13 to col. 3 line 3, claims and Figures 3A-3C, 4, 5, 7A-7D.	All

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.



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Your ref: AJR/43109
Application No: GB 0110904.0
Applicant: NEC Corporation

Examiner: Carol Ann McQueen
Tel: 01633 813620
Date of report: 28 February 2002

Latest date for reply: 28 August 2002

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Patents Act 1977

Combined Search and Examination Report under Sections 17 & 18(3)

Clarity of Independent Claim

1. Claim 1 of the present application is very unclear, especially the lines "said electrode further having, on a circumferential wall surface surrounding said recess of said central area, a through portion passing through bet surrounding said recess of said central area in said wall surface". Due to the lack of clarity of the present claim 1, I have searched for the following subject matter.

"Electrode structure of a semiconductor device for solder bonding said semiconductor device to a main substrate, wherein a central recess is provided in the electrode and said electrode further having a hole passing through between said central recess and the outer wall of the electrode"

Novelty or inventive step

2. Although your invention is not set out clearly, it seems that it might not be new or that it might be obvious in view of what is disclosed in the following document:

US 5962922 (WANG)

3. This document discloses, with reference to, for example Figures 3A to 3C, 4 and 5 the structure and method for connecting an IC substrate 10 to a mother board 18. A recess 26 is provided in the substrate 10 and is plated with a conducting material 262, this material continuing to form a rim on the substrate surface. From Figures 3A-3C, slits are shown to be provided in the cavity walls and rim. It is stated in column 2, lines 27 and 28 that these are provided to allow air to escape from the cavity when it is connected to the mother board with solder. It is also stated that this is used in a BGA package. This shows claims 1-3, 6 and 8 not to be novel. I also feel that claims 4, 5 and 7 lack an inventive step. The only difference that can be identified between the present claim 4 and 5 and the cited US document above, is the shape of the cavity, i.e. the above cited document showing a hemispherical cavity, claims 4 and 5 claiming a cylindrical cavity. I do not believe this constitutes an inventive step. Finally, I do not think a person skilled in the art would be required to exercise their inventive ingenuity to realise that such a connecting structure could be utilised in a chip scale package type device.

4. If the matter searched for, as identified above in paragraph 1, is in fact what was envisioned as being claimed in the present claim 1, then this document shows all the present claims to lack novelty and inventive step. These will have to be amended for the



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Application No: GB 0110904.0

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[Examination Report contd.]

present application to continue. Depending on the scope of amendments made a further search may be required.

Clarity and Scope of Invention

5. As stated above, claim 1 of the present application is very unclear and will need to be amended for this application to continue, since as it stands the scope of the present invention is ambiguous.
6. It is stated in claim 2 "wherein said electrode is hemispheric configuration". This is unclear and would read far better is worded as "wherein said electrode has a hemispherical configuration".
7. Claim 4 states "wherein said electrode is cylindrical having a flange portion and **having a concentric cylindrical hollow portion said reinside**". This is unclear, and I think it should probably read "having a concentric cylindrical hollow portion thereinside", as similarly stated in claim 2.
8. There is reference made in claim 5 to "said cylindrical wall surface". There is no antecedent to this reference and therefore makes this claim unclear.
9. The statement of invention on pages 2 and 3 is not consistent with the present claim 1. This should be kept in mind and addressed when amending claim 1 as referred to above.
10. On page 3, lines 8 to 10, and page 8, lines 18 to 20, it is stated that the outer diameter of the flange portion of the soldering land corresponds to the outer diameter of the conventional cylinder. Yet from Figures 2 and 4, this is clearly seen not to be correct.
11. Figure 1(c) is confusing since in Figure 1(a), the whole which passes through the wall of the electrode is seen to be in the form of a slit, whereas in Figure 1(c) it looks like it is a hole which does not continue up through the flange portion.
12. These claims will need to be amended for the present application to comply with the act. Care should be taken when amending to ensure consistency between the claims and description. Care should also be taken not to add any matter to the present application which was not originally present at the time of filing.